# VENTILATION, &c.
OF
# DWELLINGS.

ROSS WINANS.

# VENTILATION

AND

# OTHER REQUISITES

TO A

# HEALTHY AND COMFORTABLE

# DWELLING:

BY ROSS WINANS.

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*To be in accordance with the present state of science, in relation to the matters here discussed, I have consulted such authors as I deemed most reliable.*

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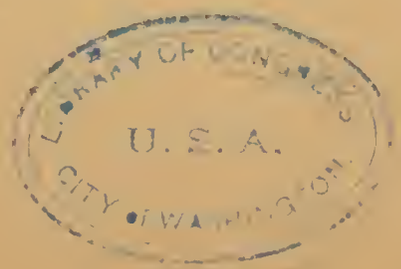
BALTIMORE:
JOHN P. DES FORGES.
1871.



# VENTILATION

AND OTHER REQUISITES TO A

# Healthy and Comfortable Dwelling.

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To be surrounded with a pure and not over damp atmosphere, and to be clean in person, is of the utmost importance to health, comfort, activity of body and mind, buoyancy of spirits and long life. We are large consumers of oxygen, mainly through the medium of the lungs. The breathing of natural air tends to purify the blood in the lungs, and to prepare it for carrying to every part of the system the ingredients for preserving and invigorating the various organs, and stimulating them to perform their legitimate functions. In this purifying and invigorating process, the air drawn into the lungs parts with oxygen and receives

in turn carbonic acid gas. It is important that in each successive breath we draw, the air should contain its natural proportion of oxygen. This, in open space, Nature has provided for. Each breath thrown out ascends in time to allow the succeeding breath to be drawn from pure air. But this important provision of Nature is curtailed in proportion as the apartments which we occupy are tight and small in dimensions.

The amount of pure air drawn into the lungs by each person when in open space, per minute, is estimated by various authorities to be from four to ten cubic feet.

In inhabited apartments various causes conspire to deteriorate the air. Not only is there loss of oxygen by respiration, but its place is supplied by an equivalent volume of carbonic acid gas. From five to eight per cent. of carbonic acid in air renders it dangerous to breathe. A person by breathing vitiates or renders unfit for breathing nearly a cubic foot of air per minute.

Combustion for the purpose of illumination also contaminates the air in a room in the same way. A candle—six to the pound—will consume one-third of the oxygen from ten cubic feet of air per hour; an oil lamp, with large burner, will produce a like result upon seventy cubic feet of air per hour. This, when considered in connection with the fact that noxious animal matter is constantly exhaling from the lungs and skin of each individual, renders it manifest that all the air in inhabited rooms of the largest size common in our dwellings, if perfectly tight, would be speedily rendered totally unfit for breathing; and in rooms of the ordinary tightness, the air in them frequently becomes very far from being fit to breathe. Undoubtedly the loose fitting of the doors and windows and chance crevices afford a partial exchange of air in most dwellings; but it is this accidental ventilation which, by effecting the purpose in an imperfect degree, has prevented an especial provision for maintaining in our dwellings a much greater purity

of air than generally pertains. A proper system of self-acting ventilation is the most practicable remedy for this serious but generally tolerated evil.

In consideration of the facts and views here given, I have been at considerable pains and expense to apply a system of ventilation to the dwellings which I am erecting in the western section of the city. The greatest amount of evil for want of pure air in dwellings is experienced in winter, when, with a view to warmth, apertures are often closed, which, if left open, would be of important advantage by maintaining the air of the room in a better condition for breathing; and especially is this tendency to closing of apertures the case with all but those who can afford to have their dwellings made comfortable, as against cold, by the introduction of warm air; which introduction incidentally serves, to some extent, as a ventilator, but far from the extent desirable or attainable. The mere fact that the openings into a room are of the *proper size*

for ventilating purposes—by means of which the air can pass into and out of a room—does not necessarily ensure the requisite degree of ventilation or maintaining the proper condition of the air in such room; these openings must be so placed and arranged as best to serve the object in view. This involves that the arrangement shall be in conformity with the laws of Nature pertaining to this subject.

Another important requisite is, that the fresh air let into the room should flow to the breather unaccompanied by objectionable currents.

From this it will be seen, that in the matter of ventilating dwellings, in the best way, and with due care to the avoiding of objectionable drafts, an important practical question arises as to what points and in what manner the air should be introduced into an apartment and allowed to leave it. The breath, as it escapes into the still atmosphere at the temperature of the body, is so rarified that in our climate it ascends. The exhalations from the surface of

the body, in like manner, and for similar reasons, ascend even in a room at a temperature of sixty-five degrees—since this is thirty-three degrees below the temperature of our bodies. A kind of natural ventilation of the person is thus effected, and as it is important not to bring the vitiated air back to be breathed over again, this movement may be taken as Nature's hint in favor of upward ventilation. In pursuance of this, I have arranged for the escape of the vitiated air—from the various apartments in my dwellings—openings near the ceilings, into what, in effect, is a large chimney, and thence into the open air. The fresh air is introduced into the rooms at such places and in such manner as to favor the escape of the vitiated air in the way just mentioned, and with a view to the fresh air being most available for breathing in its purity, while care has been taken to avoid injurious currents.

In furtherance of my purpose to combine in my dwellings to an unusual extent, the various features that are known to be favorable to the

production and maintenance of the highest degree of health and comfort, the following things have been carried out: the entire district, to the extent of many acres, upon which the buildings are situated, has been deeply and thoroughly under-drained.

To avoid the universally conceded objection to living in basements, the houses have been built four stories above the ground, and to supercede the necessity of occupying the cellar or space between the lower floor and the earth, ample provision is made for the storage of fuel, and other articles—subject to engender deleterious gases, in a covered yard at the rear of the dwelling.

Immediately beneath the lower floors of both front and back buildings, is a thick counter-ceiling, composed of boards and mortar. This has reference among other things to keeping the houses warm, while the winter blasts have free access to the space underneath the lower floors. This space is horizontally co-extensive with the entire buildings, and the

vertical measurement from the earth underneath to the lower floor of both back and front buildings, varies from three to five feet; into this space ample openings are provided on each side of the buildings for its constant ventilation, purification and drying. These openings are so situated, that currents may sweep through the entire space from side to side at all times.

There are no openings through the floors of the house communicating with this space, which has for its bottom the dry earth.

This absence of openings, together with the counter-ceiling, perpetual ventilation, and absence of storage, all have reference to guarding against air, objectionably damp, and unwholesome gases penetrating into the inhabited portions of the buildings from below. Hurtful dampness sometimes finds its way into dwellings, by capillary attraction through the pores of the brick walls from the wet earth below. When the brick of the wall is slack burned this dampness is much more liable to occur,

than when hard burned brick is used in the walls. Roofing slate laid in the walls slightly above the earth, is a good device to avoid this dampness. This precaution I applied throughout my entire buildings. I have also paid extra price for extra hard burned brick to ensure the better against dampness from the source just mentioned.

The entire drainage from these buildings is accomplished through open iron gutters; thus ensuring that no pools of filthy water remain in the gutters to produce stench and deleterious gases, neither can any such stench or gases be generated in the space beneath the buildings, since no matter subject to decomposition is to be placed there.

Much expense has been submitted to for the purpose of avoiding the placing of wood, whether belonging to the building or otherwise, in positions where it was liable frequently to alternate between wet and dry, and consequently be destined to speedy decay, and a breeder of disease, as is all decaying

matter when within or contiguous to our dwellings.

Another feature pertaining to my buildings is worthy of notice. The rays of the sun, penetrating into our sleeping and other apartments, have a most salutary effect in purifying and divesting them of all unpleasant hurtful odors and dampness. Wherever this letting of the sun's rays into our rooms can well be done, it should be practiced, in despite of all objections. My buildings are situated in parallel rows, ranging north and south, and are otherwise so arranged as to permit the sun's rays to shine directly into every one of the sleeping apartments, living and cooking rooms, also into most of the other indoor space, such as passages and stairways.

Next in importance to securing the prevalence of a healthy atmosphere within our dwellings, is to preserve a wholesome atmosphere adjacent to them outside. The miasmato engendered by the filth accumulated in courts and alleys, co-operate with indoor stench

to breed disease. To guard against this I have taken especial pains.

Bathing is among the things which are conducive to health. The means of doing this, are provided in connection with the building, as is also a supply of hydrant water, and slop drains for each of the upper stories; gas fixtures are also furnished throughout. My aim has been to combine in these buildings, more than the usual number of appliances pertaining to the health and comfort of their occupants. The various things which I have mentioned here as having to do with furnishing healthy residences, may each seem, when separately considered, as trifles, and not calculated to produce any marked beneficial results. This, in a narrow view of things may seem true, but in a large view there are no trifles; everything is important and tells appreciably on results. But it may often take a vision more piercing than that of the eagle to see from the beginning to the end, from cause to effect. Many so called trifles co-operating to

produce a certain result, often accomplish the end aimed at more perfectly, than could otherwise be done.

The minute particles of vapor of which the clouds are composed, water the whole earth with its vast robe of vegetation so lavishly, that all the rivers of the world do no more than drain off the surplus. It is wise not to be blind to the relations of little things to great ones.

Errors of thought, the greatest lapses of conduct and the chief miseries of life have frequently, if not always, their real origin in disregarded trifles. We are snared and captured like Gulliver by the multiplicity of little things which lead to destruction; on the other hand, great and good things may be accomplished by the proper appreciation and judicious use of well chosen small things.

The trifles we despise make all the difference between error and truth. Two persons start in life at the same period, apparently with equal prospects of an honorable and suc-

cessful career. The one steadily pursues the upward course to fame and wealth, the other descends to degradation and poverty. The casual observer is at a loss for the cause of this divergence, while he who properly appreciates the true relation between small things and great ones, and the bearing which one has upon the other, finds no difficulty in seeing why—in a majority of cases—one man succeeds, and the other—apparently equally endowed by Nature—fails. All this may seem foreign to the illustration of the advantages derived from breathing pure air; yet it may serve to enforce the fact that the well being of both body and mind is largely dependent upon a uniform habit of conforming to the various things unmistakably known to be conducive to health. We should remember that while the good we seek may not always be overtaken by large strides, we may generally attain to it or its equivalent by availing of that which is within easy reach. If we commence in good time—which means the sooner the better—to

make it a rule that ourselves and family conform to the laws pertaining to health, we are in a fair way of laying up for ourselves and children those inestimable treasures—a strong arm and a sound mind.

There are thousands who would barter millions of wealth for health, after having neglected the golden chance of securing it in the only way possible. A robust constitution cannot be captured in the lump or taken by storm; it can only be secured by patient perseverance, and uniform care in attending to the things upon which its attainment and preservation depend.

The necessity of ventilation results from the very nature of the respiratory apparatus. The life processes are graduated to the constitution of the atmosphere, and the healthfulness of the former depends upon the constancy of the latter. So direct is the access which respiration affords to the innermost recesses of the body, and so immediately dependent upon it is the whole circle of organic processes, that

any serious disturbance of the air, any mingling with it of deleterious ingredients cannot fail to be most injurious.

In proportion to the exercise of a muscle is its demand for oxygen, in proportion to the activity of the mind is the brainward flow of arterial blood. If air be rarified or deficient in oxygen, its respiration depresses all the powers of the constitution, physical and mental.

From tainted air follows tainted blood. If oxygen, the consumer of deleterious matter, the purifier and stimulator of the system, is withheld, the vital current is encumbered with the noxious products of bodily waste.

Under these circumstances the blood may form a ready prepared soil for the seeds of infection. Atmospheric malaria may be powerless upon a perfectly healthy system, while it would find ready lodgment in a constitution lowered in tone and vital powers by breathing bad air. Because it requires a given quantity of carbonic acid in the air to produce immediately injurious effects, it does not follow that

a much less proportion does not seriously impair the constitutional energies, and decrease the power of resisting disease. Many a case of disease proves fatal on account of an unperceived depression of the sufferer's strength by continued exposure to an atmosphere impure from bodily exhalations. That vitiated air produces intellectual stupor, depression of the feelings, headache, and predisposition to take cold, is proved by very slight observation; and upon few things is enlightened medical experience more unanimous than that it either causes or greatly aggravates the most malignant diseases, such as fevers, inflammations, cholera, and consumption. These evils from breathing impure air are added to by the occupation of basements as human habitations, even when occupied only during the day time, and not as sleeping apartments.

If it shall be said that to accomplish ventilation to the extent that a due regard for health calls for, will in cold weather increase the expense of fuel, or require more covering

to keep our bodies comfortably warm, while in our dwellings—this may be the case to a slight extent in quite cold weather; but better this, and enjoy good health and spirits and activity of body and mind than have bad health with the doctor's bill to pay. But it must be borne in mind that the best heat to counteract the effect of a cool surrounding atmosphere is that generated or developed within the system; and the heat so produced in a given time is materially augmented by the breathing of pure air, as compared with breathing the air that generally pertains in unventilated dwellings inhabited by the average number of persons, and well lighted with gas. This extra generation of heat in our persons may more than counteract the cooler air within our rooms resulting from a well devised ventilating process. The alimentary portions of the food we eat are, by the process of digestion, converted into chyle; after the food has been acted upon by the stomach, other changes take place during the process of converting it into blood,

suitable to enter into and be conveyed through the arteries and veins to supply the various wants of the body.

The function the most essential to life is respiration; and the mode in which this is performed, that is to say, the manner in which the decarbonization of the blood is effected through its exposure to the atmosphere, produces a remarkable change in the whole framework of the animal body.

The blood, after traversing the blood-vessels, which extend over every part of the body, returns to the heart, and by the involuntary muscular action of the heart, is propelled through the lungs, where it is exposed to the action of the atmospheric air, in consequence of which both the blood and the air undergo certain changes.

The blood from the right side of the heart, when it enters the lungs, is of a dark red color; it is then dispersed, in a state of most minute subdivisions, throughout the vessels of the lungs, and in these vessels it is subjected

to the influence of atmospheric air and becomes a bright red color; in this state it goes to the left side of the heart, and is thence propelled through the whole arteries of the body; when it has traversed the arteries and entered the veins, the blood thence loses its florid hue and assumes its dark red color as it returns through the veins to the right side of the heart, to be exposed, as before, to the influence of the atmospheric air, and to undergo the same succession of changes.

Notwithstanding the great change which takes place in both the blood and air, from their joint presence in the lungs, yet they do not come into actual contact while in the state in which they were when they entered the lungs.

They are separated by a thin membrane, organized in such a way as to permit the air and blood in the lungs, so to act upon each other as to dissolve existing chemical combinations, and to form others in accordance with the laws pertaining to life and health. The

blood receives through the membrane oxygen from the air, and at the same time the air receives from the blood carbonic acid gas and watery vapor, which is exhaled from the lungs. The blood having thus parted with its superabundant carbon, and absorbed the requisite quantity of oxygen to restore it to the qualities of arterial blood, is qualified to be again transmitted to the different parts of the body for their nourishment and growth. Further, the heat developed in the animal system is brought about by the action of the oxygen of the air we inhale and the carbon of our blood upon each other, resulting in the production of heat for the system and the carbonic acid gas we exhale; this is analagous to what takes place during the development of heat by the combustion of coal for domestic or other purposes. The carbonic acid gas, the refuse, resulting alike from development of heat within our persons and in the coal fire, if not suffered in either case to escape from the place of combustion, and be succeeded by continued fresh

supplies of oxygen, would speedily terminate the generation of heat, and both the flame of the coal fire and the vital flame in man would at once be extinguished, even when there was no lack of carbon or fuel in either case.

To continue the analogy, the source of heat, whether produced within the human system or by a common fire, is the converting latent heat into sensible heat or free caloric resulting from the chemical changes induced by the action of oxygen and carbon, upon each other, whether this action is brought about under the operation of ignited coal or the vital influence residing in man; an example of this disengaging or liberating of latent heat and its appearance as free caloric is furnished by the slacking of lime with water. When water is passing into vapor or steam, its capacity and demand for latent heat is very much increased, and to supply this demand sensible heat is drawn from surrounding objects, which the process of vaporization converts into insensible heat. This law Nature applies for the purpose of preserving

the temperature of our blood at or within one or two degrees of ninety-eight. To make this law available, a much larger amount of heat is generated in the body than is necessary to meet the ordinary or even the extraordinary demand for it, and we are so organized that whenever the heat of our blood is in danger of going above the prescribed degree, moisture exudes from our skin, and through its vaporization from the surface, the sensible heat of our bodies is converted into latent or insensible heat and passes off with the vapor; thus the normal temperature of our blood is preserved as aforesaid. It is of interest to note that we get the sensible heat for the use of our bodies in superabundance from the latent heat of other substances, and we get rid of surplus by its being converted into latent heat to supply the demand of other substances.

Life then, consists of a continued series of actions and re-actions, ever varying, yet constantly tending to definite ends.

Heat is stored up in a latent state, in organic substances and chemical combinations, and is disengaged or rendered free during their decomposition or change of chemical affinities whether by slow decay at a low temperature or by rapid dissolution at a high temperature as by fire.

In the latter case the heat set at liberty is more apparent, because of the rapidity of the process and the little time allowed for the sensible or free heat to be distributed among other substances and escape our notice as in the case of slow decay. This rapid decomposition of organic substances and speedy dissolution of chemical combinations by fire, constitutes its value as an instrument of power in our hands. It enables the stored up powers of nature to be made available to man; it enables him to deal with the gigantic waves of the ocean as does no other known power; it enables him to twirl the thousands of spindles with a celerity truly wonderful; it enables him to smelt and separate from their dross, the crude metals of the earth and to shape them into the millions

of forms useful to man; and it enables us to propel the ponderous car from ocean to ocean with the speed of an eagle's flight. And again Nature's stored up power is brought into requisition to impel the master-piece of mechanism through the medium of combustion. The human machine moves not until the fires of life are lit—

> Whether for weal or woe,
> This much I know,
> While not through man the flame appears,
> It is for him to feed in after years.

It appears as the result of numerous experiments—by Professor Miller and others—that in the production and maintenance of animal heat and supplying the other requisites of the body, a man of ordinary stature consumes in the course of twenty-four hours, nine ounces (Troy) of carbon; that the heat developed during the combustion is sufficient to boil away eight pounds of water; that the consumption of oxygen in this process is equal to twenty-four

ounces or nineteen and a half cubic feet; that the quantity of air vitiated amounts to ninety-seven cubic feet, and the product in carbonic acid to thirty-three ounces.

When the blood returns from the various parts of the body to the heart and lungs, it bears with it the refuse, the product of the wear and decay of the system. After this waste matter or the gases resulting therefrom have been separated from the blood, it is, through the process of breathing, expelled from the lungs.

This refuse may, in the economy of nature, have served in part or in whole as fuel for the production of vital heat.

When the blood leaves the heart to go its accustomed round, it has been purified, replenished and prepared with means of developing warmth, making up the waste, promoting growth and supplying the various requirements of the entire system. Thus the stream of life ebbs and flows in turn. While the vital flame continues to burn, each individual

by seconding the design of nature in relation to his species may lengthen out his days and increase the enjoyments of life. There is another branch of this subject upon which as yet little has been said which is too important to the highest state of health to be left unnoticed.

I refer to the action of the skin, co-operating with that of the lungs in purification of the blood, and consequently maintaining the health of the entire system.

Besides answering merely as a covering to the body, the skin performs various useful functions in our general economy. An ordinary observer would suppose that the surface of the body from its smoothness was so close in texture, that neither air nor liquid could pass readily through it. Such is not the case.

The whole membrane may be likened to a sieve: throughout its entire extent, externally and internally, there are a multitude of small holes or outlets; these are called pores communicating with ducts beneath, and the ducts

terminate in glands or receptacles in the muscles.

By this arrangement, portions of the fluids and gases no longer required in the system are conveyed to the surface of the body, when they escape into the atmosphere usually in the form of vapor, but sometimes as liquid or sensible perspiration. In the extreme heat of summer or when engaged in hard work, this liquid exhalation is very apparent. Not being observable under ordinary circumstances, it is styled the insensible perspiration. In this office of an exhaler, the skin acts as an auxiliary to the lungs, which throw off more copiously the waste of the system in the form of vapor and deteriorated air.

The amount of these two kinds of exhalations from the skin and lungs, varys from two to five pounds per day; hardworking men during very warm weather, very much exceed the highest amount above named.

This exhalation of vapor and liquid from the body serves to purify the system and

regulate its temperature. The lungs in addition to their other functions act as a cleansing apparatus, so also do the pores of the skin; and as before mentioned, they are auxiliary to the lungs; the two working together to accomplish the same important end of throwing off the decomposed and useless matter, and are in such close sympathy with each other, that when one is deranged, the other suffers and health is consequently impaired.

Besides their exhaling functions, the pores and other minute organs of the skin absorb air and moisture from the atmosphere, though less actively than the lungs and are therefore inlets as well as outlets to the system, and hence may in some degree assist in furnishing the required oxygen for the support of heat and life. Along with the liquid or vapor exhalations from the skin passes off the superabundant heat of the body. If therefore we check this insensible perspiration, this superabundant quantity of heat unable to make its escape at the surface returns to the vital organs

within. Fevers, rheumatism and other maladies are the consequence. Any considerable clogging of the pores of the skin renders them unable to expel the insensible perspiration with sufficient energy which tends to produce the above mentioned difficulties. This shows that it is of great importance to health to keep the pores of the skin in such a condition as not to materially check the requisite amount of insensible or other perspiration or the exhaling the gases resulting from the waste matter of the system. Entire immersion of the body in a bath of tepid water is unquestionably the most effectual means of cleansing the skin from its natural or artificial impurities, and of refreshing and invigorating the whole system.

To persons whose occupation is such as to render it difficult or impossible to keep their apparel or person as clean as they desire, these ablutions are indispensable to personal comfort and self-respect.

"In European countries, the laboring classes practice bathing much more than here. The inhabitants of countries in which the bath is habitually used, anxiously seek it, in full confidence of its salutary effects in affording longevity and vigorous health.

We breathe twenty times every minute, consequently twenty-eight thousand times every day; and nothing but absolute and perfectly pure air answers the exact requirements of perfect health of body and mind.

He who realizes the truth of this is bound, by every consideration of duty, to take such measures as are fairly within his reach, to avail of the advantages of cleansing the blood by breathing pure air, and the kindred advantage of cleansing the person by bathing in pure water.

Next to feeling conscious that you are a true, honest and industrious man, nothing tends to elevate one more in his own estimation, and in that of others, than the living in a clean, comfortable, well aired dwelling, and the being

as clean in person and dress as is consistent with his occupation.

But notwithstanding all that has or can be said upon the subject, I am of the opinion, that to make ventilation in private houses really and permanently useful, it must act at all times spontaneously. Any call upon attention, even such as the opening of windows, or their regulation in a particular manner, will be apt to be neglected, more especially in places where the inmates cannot at once perceive the reason, or that any apparent advantage is to be derived from the additional trouble required; my process of ventilation is in accordance with this view, leaving nothing to be done or undone to ensure efficient ventilation, neither will there be any ready mode of preventing it.

## INFLUENCE OF HUMAN EFFLUVIA.

I find in *Ranking's Abstract*, a sensible article on this subject, by Mr. Grainger, from which I extract the following paragraphs:

"If physicians would study such subjects vastly more, and the *modus operandi* of drug remedies vastly less, they might, perhaps, soon find themselves on the platform we are compelled to occupy."

"According to my own opportunities of observation, the most injurious of all the causes operating in the diffusion of epidemic diseases are the effluvia proceeding from the human body, and especially from the lungs and the skin. The special deleterious agent consists of the effete and—as it has been proved experimentally—highly putrescent organic matter, mingled with the expired air. That it is, when re-introduced into the living body, liable to be highly injurious, may be inferred from the fact of the careful provision made by nature for its incessant elimination from the system. That it is small in amount, is no objection to the intensity of its action; for to the physiologist it is well known that a minute quantity of a powerful agent—the putrid matter introduced on the point of a

needle in the inspection of a dead body—a single drop of concentrated prussic acid placed in the mouth of an animal is sufficient to destroy life. It is in overcrowded unventilated bedrooms, schools, workhouses, dormitories, &c. that this effete matter taints the air, and, entering the blood, poisons the system. That the remarkable diminution in the amount of carbonic acid evolved from the lungs, where persons, as in crowded and unventilated apartments, breathe an impure atmosphere, acts in such cases injuriously, admits of no doubt; but the evil, *quoad* the development of fever, scarlatina, cholera, &c., depends on the organic, and not on the chemical products of respiration. As one indication of this, it may be explained that it is possible under certain circumstances to observe the action of the former when separated from the latter. As soon as the expired air quits the body, the matters of which it consists have a tendency to separate; and as regards the two substances under consideration, the carbonic acid mixes

with the atmosphere on the principle of diffusion; while the animal excretion, no longer held in solution by the colder external air, is deposited, and particularly clings to woolen articles, as bedding and clothes; which last, as it is well known to medical men, the clergy and others, will often retain for hours, or even longer, a foul smell from this cause alone. When this matter, from neglect, is allowed to accumulate, it will affect the health. An instance of this was mentioned to me by the surgeon of a large pauper school, where the health of the boys was decidedly improved by substituting for the usual dress, clothes capable of being readily washed."

"When cellars are damp, the air in the upper part of the house cannot be pure, and the disagreeable and hurtful odors of everything in the cellar, must pervade the superincumbent atmosphere. Provisions will not keep in damp cellars, and indeed the whole economy of house-wifery is materially interfered with in such cases. All cellars not constantly

and thoroughly ventilated, are in fact, more or less damp, and are therefore objectionable for the reasons above given, and especially when there are articles stored in them which can engender odors or stench."

I make the following extract from a work by Dr. W. W. Hall, editor of HALL'S JOURNAL OF HEALTH.

"Let the sun come into our dwellings, and let our chambers be on the sunny side of the house. A room that the sun is not permitted to look into at all, should be without a door; it is unfit for human occupancy. Even the flowers will grow pale, and be frightened to death in it. The primary object of a window is not for the sons of men to look out, but for the sun to look in.

"Pleasant sunshine not only brightens a man's buttons, but his heart; it makes his spirit as cheerful as the landscape—he cannot be happy without it.

"Sir James Wylie, late physician to the Emperor of Russia, attentively studied the effects of light as a curative agent in the hospitals of St. Petersburg: and he discovered that the number of patients who were cured in rooms properly lighted was four times greater than of those confined in dark rooms. This led to a complete reform in lighting the hospitals of Russia, and with the most beneficial results. In all cities visited by the cholera, it was universally found that the greatest number of deaths took place in narrow streets and on the sides of those having a northern exposure where the salutary beams of the sun were excluded.

These different results are due to the agency of light, that is, the direct rays of the sun without a full supply of which plants and animals maintain but a sickly and feeble existence.

"The following fact," says a good authority, "has been established by careful observation: That where sunlight penetrates all the rooms

of a dwelling, the inmates are less liable to sickness, than in a house where the apartments lose its health invigorating influences. Basement rooms are the nurseries of indisposition. It is a gross mistake to compel human beings to reside partially underground.

There is a defective condition of the air in such rooms, connected with dampness, besides the decomposing paint on the walls, and the escape of noxious gases from pipes and drains, It is strange that builders persist in doing violence to humanity by still erecting houses with basements.

Florence Nightingale observes: "A dark house is almost always unhealthy, always an ill aired house. Want of light stops growth, and promotes scrofula, rickets, etc., among the children. People lose their health in a dark house, and if they get ill, they can not get well again in it."

*Advantages of Gas in Private Houses*, by E. E. Perkins.—There are thousands of fami-

lies who would readily avail themselves of the various comforts and conveniences of gas, provided its relative cost and other matters were properly explained to them.

The superiority of gas consists not merely in the relative cheapness of the light obtained from it, as compared with that from *tallow*, *wax*, oil, camphene, &c.; there are other circumstances connected with its use which are of a far greater importance—namely, its convenience, cleanliness, brilliancy, manageability and safety.

Requiring no preparation by the consumer, it is lighted in a moment, can be increased or diminished at pleasure, and retires with the rapidity of thought. It saves labor and time, as compared with oil and other lamps, and where candles are used.

As a general rule, it is desirable, in drawing and dining rooms, to suspend the burners from the ceiling; by which arrangement the light is more equally diffused, and, by being above the eye, its position is more natural,

and, for all practical purposes, more useful and agreeable.

It has been said that gas-light is injurious to the eyes. This is fallacious; no eye was ever injured by the use of gas more than from any other kind of light; besides, the means are so exceedingly easy, by which the exact quantity of light by gas required in any particular occupation may be had, that there is no need for an excess which would be even unpleasant. On the contrary, it has been found that a deficiency of light in performing the most ordinary matter in life, as reading, writing, sewing, &c., has produced more injury than will be willingly acknowledged. Let it be remembered, too, that the situation of a light is of as much importance as its intensity; it should, moreover, always be above the eye; the light from candles and lamps for tables is commonly too near the line of vision to be either comfortable or harmless.

When gas is first introduced, it rarely happens that persons are satisfied with the same

quantity of light as they had previously possessed; so long, however, as this extra supply is kept within moderate limits, it will cause no material difference in the result at the end of the year. While we impress upon our readers the importance of distributing light as much as possible through the various parts of a house, we beg them to observe the same rule which prevails in every well regulated family with regard to lamps and candles, viz: that it be used only in such quantities, and at such times, as is really necessary; in which cases it will be found less expensive than either lamps or candles.

Experience has shown that a small light in a house, provided it be so situated that its effects may be visible from the outside, is one of the most efficient means of protection against nocturnal depredations. If conveniently placed, such a light will be no less useful to the inmates of the house; in case of sudden alarm, or illness at night, is not a light the first thing required, and can it be too promptly obtained?

Once more, let me say, take care of your health, now that you are warned of the thief who would stealthily filch it from you. If you be not on your guard, you become his accomplice—not on guard occasionally, but *habitually*, else you plot against yourself to destroy a treasure that millions cannot purchase. Without health life is a drag—with it you have the blessing which is above price.

Ross Winans.